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ABSTRACT

The purpose of this study was to determine if the moral voices of care and justice, as described by C. Gilligan (1982), would be expressed in the solutions to environmental dilemmas selected by 7th grade students. A further goal was to determine if those voices were differentially expressed by girls and boys, and if that difference was related to gender alone or to gender role orientation. The Environmental Dilemmas Measure of Moral Orientation Survey presented 281 urban school students with 9 environmental dilemmas and 2 response items, each resulting in 18 items and 2 subscales, one designed to measure the care orientation in response to environmental situations, the other designed to elicit the justice orientation. Results showed that the three-item care scale was strongly associated with the female participants in the study, lending support to the extension of Gilligan's theory into the area of environmental science. When controlled for gender role orientation, the association of the care voice with sex was eliminated. The feminine gender role orientation was the stronger determinant of the care voice for the participants of this study. Environmental education is being integrated into an increasing number of science curricula. If consistent gender differences are found in the evaluation of environmental dilemmas, it will be important for educators to be aware of these differences so that they can teach to each student's strengths, and consider them when designing programs and assessments. Contains 46 references. (CCM)

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Moral Voices in Environmental Education:

The Relationship to Gender and Gender Orientation

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The purpose of this study was to determine if the moral voices of care and justice, as described by Gilligan (1982), would be expressed in the solutions to environmental dilemmas selected by 7th grade students. A further goal was to determine if those voices were differentially expressed by girls and boys, and if that difference was related to gender alone or to gender role orientation.

There is a natural connection between environmental science and the study of moral development. As environmental problems grow more urgent, demand for education and critical analysis on the part of all citizens increases. Because today's students will be tomorrow's citizens and voters, it is important that they be scientifically literate and able to use information to analyze a problem and identify viable and equitable solutions. Both now, and later as adults, students will encounter environmental dilemmas involving conflicting needs between groups of people and among people and animals, plants, and ecosystems. Due to the complexity of such dilemmas, there will rarely be a single solution. Because these dilemmas involve the welfare of many people as well as the ecosystems in which they live, scientific knowledge will not be sufficient to create satisfactory solutions. There is a moral and ethical component to finding solutions that protect the ecology of the planet and that meet the needs of all parties involved to the maximum extent possible. Including environmental ethics as an integral part of environmental education will prepare students to deal with these issues. This view is reflected in the work of two British researchers. "It seems to us that making decisions on these complex matters will be aided if we are clear about our own values and have an understanding of the way in which values underpin decision making. Schools could play a central role in helping to prepare citizens who are capable of valuing, thinking and acting in this way" (Scott & Oulton, 1998, p. 5).

Because this moral dimension is inherent in environmental decision-making, children's moral development becomes relevant to environmental educators. Just as teachers take into account the cognitive level of their students in planning instruction, it would be helpful for environmental educators to know the moral developmental level and orientation of their students. Instruction could then be focused to emphasize the strengths of students and to address areas of weakness. Although it would be possible to teach ecological concepts and information without a values or ethics component, the goal of environmental education to enable students to identify problems, prioritize them, and make decisions about possible solutions assumes that value judgements will be made, thereby involving the student's moral development.

Environmental ethics, attitudes, and reasoning among young people were assessed by Szagun and Mesenholl in 1993. They surveyed 830 German adolescents and found a high degree of ethical concern for nature. Szagun and Mesenholl suggest that "Ethical concerns may be strong motivators for preserving nature, possibly more so than enjoyment of nature, which is often stressed in environmental education" (p 43). Other researchers have used moral dilemmas to investigate the thinking of children in this area. Nevers, Gebhard, & Billmann-Mahecha (1997) involved groups of children in discussions of conflicts between children and aspects of the environment. Environmental dilemmas were used by Aho, Permikangas, & Lyyra (1989) to examine children's problem-solving modes. In this study students were presented with environmental situations and asked to provide written solutions to the problem described. The majority of the students' responses stressed valuing and protecting nature because it is essential to humans and other living things. A number of investigators have used multiple-choice scales to study children's knowledge levels and attitudes about environmental issues, but these instruments

were not designed to evaluate the moral voices or orientations of the children participating in the studies (Lemming, Dwyer, & Bracken, 1995; Musser & Malkus, 1994).

Differing moral developmental levels is one factor that complicates the task of helping students learn to evaluate environmental issues. Kohlberg's Moral Judgment Interview (MJI) was developed to identify an individual's level of moral judgment (Colby & Kohlberg, 1987). Using the MCI, an individual's developmental level is evaluated by an analysis of their proposed solutions to hypothetical moral dilemmas and most importantly, their reasons for the suggested solutions. Kohlberg described a progression from Stage 1, in which individuals make judgments from an "egocentric point of view" to Stage 6, in which individuals' moral judgment is based on "universal ethical principles" (p.18).

In Kohlberg's system, women are often described as functioning at a lower level than men and rarely reaching the higher levels (Bakken & Ellsworth, 1990; Bardige, 1988; Krebs, Vermeulen, Denton, & Carpendale, 1994). The validity of the lower evaluation of women was challenged by Carol Gilligan (1982) on the basis of Kohlberg's use of all-male research samples and his reliance on hypothetical situations. Gilligan contended that the hypothetical dilemmas used to determine stages in the Kohlberg scheme were not relevant to women's lives and therefore would not elicit responses which could be used to evaluate women's moral development. In her studies of women engaged in working through real-life moral dilemmas, Gilligan (1982) found that girls and women respond by attempting to fulfill the needs of everyone involved and to maintain relationships, an approach she called the ethic of care. According to Gilligan, boys and men more often solve problems from a detached, objective consideration of rights, a viewpoint referred to by Gilligan as an ethic of justice (1982).

Two researchers have developed instruments to measure the care and justice moral orientations (Liddell, In press; Liddell, L., & Davis, T., 1996; Yacker & Weinberg, 1990). Liddell and Davis (1996) developed an objective test of moral orientation to distinguish between the care and justice orientations described by Gilligan and to "measure the strength of a person's moral voice" (p 486). This instrument was tested on 381 college age participants and was later evaluated by comparison to data obtained by interviewing students (Liddell, 1997). There was a strong correlation between data obtained by the two methods.

The second instrument, the Moral Orientation Scale, created by Yacker & Weinberg (1990) measured moral orientation in adults by asking them to rank order response alternatives to childhood dilemmas. Their data showed that "females were more care oriented than males" and that profession also was a factor. They did find, however, that participants in their study were not exclusively care or justice oriented. "The individuals in our sample do not fall clearly into one category or another. Rather, consistent with Gilligan's own findings, they exhibit tendencies or propensities for one or the other type moral thinking" (p 26).

Although a number of researchers have examined caring in relation to the environment, there is no established instrument designed to elicit the expression of moral voices of care and justice in response to environmental dilemmas.

Definition of Terms

1. Environmental dilemma - a situation involving a conflict in which the available choices have environmental or ecological consequences and in which the student has some power to influence the outcome.

2. Moral orientation - The framework of ideas and beliefs from which individuals make moral decisions.

3. Care orientation - Moral reasoning in which individuals interpret situations "in terms of care and responsibility toward others, of connection, and of the preservation of relationships" (Yacker & Weinberg, 1990, p 19).

4. Justice orientation - "Moral reasoning informed by the need to preserve individual rights and maintain predictable rules for resolving instances of competing rights" (p 19).

Assumptions

It was assumed in this study that 7th grade students:

1. are both aware of environmental issues and concerned about them.
2. have had experience with making decisions in this area.
3. have a sense of agency, that is, they believe that their actions can influence environmental consequences.
4. possess sufficient knowledge to be aware of and to predict accurately the consequences of alternative courses of action.
5. have developed a characteristic pattern of moral thinking and problem-solving.

Purpose

The purpose of this study was to investigate the following questions:

1. Will the moral voices of care and justice be expressed by seventh grade students in response to environmental dilemmas?
2. Will the voice of care be associated with girls and the voice of justice with boys?

3. Will the voice of care be associated with a traditionally female gender role orientation and the voice of justice with a traditionally male gender role orientation?

Literature Review

Values and Environmental Education

As early as Rachel Carson's Silent Spring (1962) the responsibility to make ethical choices has been a part of environmental science. During the 1970s and 1980s concern for the environment grew rapidly, and it became apparent that solutions to the environmental problems were neither simple nor value-free. "As with all social issues, those on opposite sides of environmental disputes have conflicting personal values" (Goldfarb, 19 , p. xiv).

National and international groups have urged that environmental education be increased and include both scientific content and environmental ethics. "A new ethic, embracing plants and animals as well as people is required for human societies to live in harmony with the natural world on which they depend for survival and well-being. The long-term task of environmental education is to foster or reinforce attitudes and behaviors compatible with this new ethic" (IUCN/UNEP/WWF, 1980, Section 13, p. 3, Scott & Oulton).

The awareness of the role played by values and ethics has increased as problems have become more acute, leading to the rise of the field of environmental ethics. DesJardins (1993) states that "Environmental problems raise fundamental questions of ethics and philosophy. Reliance on science or technology without also considering the ethical and philosophical issues can raise as many problems as it solves" (p. 4).

In discussing the role of values in education Scott & Oulton (1998) assert that the "linking of values with schooling, and with environmental education, is appropriate as values underpin everything we humans do in (and with) the world, not least our understanding and practice of that social interaction which we call education" (p. 2). Because we are educating our children to handle the environmental problems of tomorrow and because the solutions to these problems require moral decisions, moral education must accompany scientific content in environmental education.

A number of researchers have investigated the level of environmental knowledge and the attitude toward environmental issues expressed by children (Blum, 1987; Burrus-Bammel & Bammel, 1986; Roth & Perez, 1989). They report that, although environmental knowledge is generally low, boys score slightly higher in knowledge and girls slightly higher in concern for the environment. For example, Housbeck, Milbrath, and Enright (1992) sampled 3,207 11th-grade students in New York State, from urban, suburban and rural areas. These students expressed a high degree of awareness and concern for environmental issues (somewhat higher among females), but a low level of knowledge (somewhat higher among males).

Other researchers have found more subtle differences in the approach taken by men and women. Zimmerman (1996) developed a short form of the Children's Environmental Response Inventory and tested it on 79 undergraduates at the University of New Mexico. Only one subtest showed significant gender differences. Men were more likely than women to support the right to dominate nature (to modify nature for human use). Aho et al. (1989) found a greater difference in the approach to solving environmental dilemmas in their work with Finnish children in grades 4 to 6. They asked 357 preadolescents to provide solutions to environmental problems involving

conflicting needs. A number of gender differences were found, including (a) girls wanted more information before deciding on a solution, (b) girls examined the issue from alternate points of view, (c) girls more often chose a conservation solution and (d) boys more often chose an economic profit model. Szagun and Mesenholl (1993) asked students to give reasons for describing environmental destruction as unacceptable. The girls' answers more often reflected a "consideration for nature when caring was stressed" (p.40), and boys more often chose a response of "no interference with natural systems" (p. 40), a more justice-oriented response.

Beringer (1992) has examined ethics and morality in relation to environmental issues using semi-structured interviews with 11th grade students attending an environmental school. She advocates developing an environmental morality in an inductive way, arising from people's concerns and experiences instead of deductively, applied to people's lives from general principles. "The ultimate source of ethics, then, is not a particular ethical theory but the mores, principles, and obligations grounded in a moral community" (p. 19). She found evidence for an ethic of care among both male and female students.

Gender Differences in Moral Development

To effectively integrate moral development and environmental education, teachers must be familiar with the tenants of moral development. Theories of moral development have a big influence on how children are raised and educated and how society is structured. The importance of this issue has fueled a continuing dialog about the paths followed in the moral development of men and women.

Lawrence Kohlberg described a stage theory in which the level of moral reasoning is evaluated by examining how people resolve hypothetical moral dilemmas (Colby, Kohlberg,

Gibbs, & Lieberman, 1983). At the highest levels, moral decisions are based on abstract principles of justice. Women score lower than men when evaluated by researchers using Kohlberg's Moral Judgment Interview (Bakken & Ellsworth, 1990; Bardige, 1988; Krebs, Vermeulen, Denton, & Carpendale, 1994).

Gilligan (1982) investigated the moral reasoning of women while they were engaged in making moral decisions in their lives. In interviews, women consistently described complex situations involving connections between people. Conflicts arose as they attempted to make decisions that fulfilled the needs of everyone involved. The participants in Gilligan's research viewed their situation as being enmeshed in a web of relationships, with each choice involving the possibility of causing hurt to someone. The stories told by these women made clear their struggle to find solutions without causing hurt to themselves or others. Gilligan described this approach as an ethic of care and identified three stages in its development. This ethic of care informs the moral voice with which girls and women speak, just as an ethic of justice, the abstract, principled moral reasoning described by Kohlberg, is heard in the voices of boys and men. Gilligan's proposal of two parallel paths of moral development and her use of real-life situations in addition to hypothetical stories inspired a great deal of subsequent research in this area.

Some researchers have reported strong associations between these moral voices and gender (Gilligan & Attanucci, 1988; Johnson, 1988; Lyons, 1988). Working with adolescents reading about the holocaust, Bardige (1988) found that girls consistently focused on lack of care as being the primary issue, although they did use some rights-oriented language as well.

Both women and men have been found to solve moral dilemmas from a perspective that included both care and justice (Bardige, Ward, Gilligan, Taylor, & Cogen, 1988; Lyons, 1987,

1988). Johnson (1988) asked participants to provide solutions to moral conflicts in fables, after which they were asked if there was another way of solving the problem. Participants who had originally answered from a care perspective responded with a second solution from a justice perspective; those who had originally solved the problem from a justice perspective responded to the follow-up questions with solutions based on a care orientation. The participants were then asked to choose the best solution. It was here that the most significant differences were found, with women identifying solutions from a care or response framework and men working from a justice or rights orientation. It was clear that women and men know and understand both orientations but prefer to analyze and solve problems from different moral perspectives. These results were found in another study in which participants discussed moral dilemmas from their own lives (Johnson, 1988; Lyons, 1987, 1988).

Gilligan and Attanucci (1988) also found that both men and women expressed care and justice perspectives. In three studies involving a total of 34 women and 46 men, with the majority (50) in the 15 to 22-year-old age range and the remainder (31) from 23 to 77-years-old, male and female participants were matched for level of education, with the adults being matched for occupation as well. A more complex rating system was used in this study, with responses coded as Care Only, Care Focus (primarily care but including elements of justice, Carejustice (strong elements from care and justice perspectives), Justice Focus (primarily justice but including elements of care), and Justice Only. Two-thirds of the responses involved elements of both moral orientations (i.e., Care Focus, Carejustice, and Justice Focus). There were, however, strong gender differences, with the Care Only responses given only by women, the majority of Care Focus given by women (only one man), and Justice Focus and Justice Only responses given much

more often by men. The authors suggested that individuals responding from either a strong care orientation or a strong justice orientation may be looking at situations from too narrow a perspective and that a mature moral orientation may be one that combines the care and justice perspectives. This is supported by Walker's (1987) finding that adults were more likely than children to use a combination of care and justice orientations.

A number of investigations have found no significant evidence to support the difference in voices of men and women delineated by Gilligan (Carlo, Koller, Eisenberg Da Silva, & Frohlich, 1996; Clopton & Sorell, 1993; Daniels, D'Andrea, & Heck, 1995; Friedman, Robinson, & Friedman, 1987; Walker, de Vries, & Bichard, 1984; Walker, de Vries, & Trevethan, 1987; Wark & Krebs, 1996). Among these studies, some have supported the work of Kohlberg (Bakken & Ellsworth, 1990; Krebs et al., 1994; White, 1988) and others have found two distinct moral voices but attributed them to factors such as cultural differences (Carlo et al., 1996; Daniels et al., 1995) or the situation involved (Clopton & Sorell, 1993; Walker, 1987; Ward, 1988).

Researchers in Brazil and Hawaii examined differences in moral reasoning and found no significant association of voice with gender (Carlo et al., 1996; Daniels et al., 1995). However, respondents in both areas voiced a high percentage of care solutions. These researchers hypothesized that the cultural traditions of Brazil and Hawaii in which these students were raised fostered a care perspective.

There is evidence that the voices of care and justice are related to the situation (Walker, 1987; Ward, 1988; Wark & Krebs, 1996). When Clopton & Sorell (1993) limited the domain of their study to parenting dilemmas, all of the solutions presented by 40 married couples were from the care orientation. Ward (1988) asked 51 tenth-grade students to relate moral conflicts they had

faced. Care responses were elicited by stories of family violence in these students' lives and justice responses were elicited by descriptions of neighborhood violence.

As parenting and family-related issues are more frequently reported by women, it may be that care responses are elicited by these types of dilemmas. Walker (1987) found more family-related issues reported by women who were full-time homemakers as well as those employed outside the home, and that the content of dilemmas had a significant effect on the use of care and justice perspectives. This does not necessarily contradict the association of the care voice with women and the justice voice with men, but may instead suggest that social and cultural roles for women explain why the two moral orientations are usually but not exclusively related to gender.

A related factor to be considered is that of gender role orientation as opposed to simply gender. Two investigations of the relationships among moral stage, moral orientation, gender role, and gender found no significant effects between gender role orientation and moral voice (Friedman et al., 1987; Wark & Krebs, 1996). However, the authors described limitations of their work that indicated a need for more research in this area.

Just as Gilligan criticized Kohlberg's work on the basis of sample and methods, her work has been criticized for using samples that were limited to white, middle-class participants with a high level of education. Other research has suggested that patterns and levels of voice may not be consistent in more diverse samples (Orenstein, 1995; Ward, 1988). When Way (1995) interviewed 12 inner-city, low-income, adolescent girls from a variety of ethnic backgrounds, the majority (10 out of 12) considered themselves to be outspoken across a variety of settings. While Way did not analyze the moral voices of both boys and girls, her research with these girls provides evidence that patterns of voice may vary with ethnic or cultural background.

It has also been suggested that the different voices may be associated with dominant and subordinate positions in society (Gilligan & Attanucci, 1988; Johnson, 1988). In one segment of the Gilligan and Attanucci study the sample of medical students included 20 Black, Hispanic, and Asian American students and 19 White students. Responses from minority students were more likely to be in the Justice Focus category and the White students' responses in the Care Justice category. Given women's subordinate position in society, this finding is curious and indicates a need for more research in this area.

This subordinate position has historically resulted in women having a lower level of education than men, a factor significantly correlated with moral development in studies by Bakken and Ellsworth (1990) and White (1988). This could account for some of the difference in the evaluation of men and women when measured by either Kohlberg's or Gilligan's methods.

Colby and Kohlberg (1987) also suggested that the different results with males and females "are not inherent gender differences, but are due to the unequal social and political status of men and women in particular societies" (p 142). In a longitudinal study of Israeli adolescents living in a kibbutz, no significant gender differences in moral stage were reported. This may be interpreted as offering support to the universality of Kohlberg's theory or to the idea of gender role orientation as a determining factor. Kibbutz males and females may have similar moral development as a result of the degree to which "kibbutz society strives to provide general equality to its female and male members" (p 142).

Because moral development research deals with people as the focus of research, there is rarely a single factor at work. Gilligan and Wiggins (1988) identified biological sex, psychology of gender, and cultural norms and values as factors influencing moral development. Research since

the publication of Gilligan's (1982) In A Different Voice has reflected this complexity. Some studies have found the voices of care and justice associated with gender. Other studies, especially those in more recent years, have found these voices to be correlated with factors including age, race, culture, educational level, gender role orientation, and the specific dilemmas presented for analysis. These results may be due to changing gender roles in society or it may be due to researchers making finer distinctions in the factors they select to study. Clearly, there is a great deal of work still to be done in this area. As there is no established instrument designed to elicit the moral voices described by Gilligan in response to environmental dilemmas, it was the goal of this study to develop an instrument to begin isolating the effect of these variables.

Method

Participants

Participants were 281 seventh-grade students (142 girls, 139 boys) enrolled in 4 urban schools in the Southeast. The ethnicity of the sample was as follows: African American, 51.2%; Caucasian, 42.7%; Hispanic, Asian, Native American, each 1% or less.

Instrument Development

The survey designed for this study, the Environmental Dilemmas Measure of Moral Orientation, presented students with nine environmental dilemmas with two response items each, resulting in 18 items and two subscales, one designed to measure the care orientation in response to environmental situations and the other designed to elicit the justice orientation. For each situation described, one possible action is based on a care orientation and one on a justice

orientation. Students were asked to rate the degree to which they were likely to engage in each action on a scale ranging from 1 (Definitely not do this) to 6 (Definitely do this).

The development of this instrument began with small pilot in which 17 children were asked to write brief essay responses to three open-ended dilemmas adapted from EarthMatters (Wasserman & Doyle,1991) and Project Wild (Western Regional Environmental Education Council, 1983). Recurrent themes in their responses were used to write some response options. Others were developed from EarthMatters and Project Wild. Items were selected based on several criteria: those items that were likely to be familiar to students living in urban areas in the Southeast; those that were within the sphere of control and experience of middle grades students and; those for which clear care and justice responses could be written. Because researchers have reported that content plays a significant role in the elicitation of care and justice responses (Clopton & Sorell, 1993) and that young people typically have a high degree of concern for animals, the number of items involving animals was limited to less than half of the total in an effort to separate participants' general feelings for animals from expression of their moral orientation.

These responses were edited to reflect care and justice orientations based on the work of Gilligan and Attanucci (1988). The care responses were written to highlight concern for the welfare of animals, people, and ecosystems and to emphasize connections among people and the environment. Justice responses were based on rights and laws. All response items were designed so that both options were active and pro-environmental, to avoid measuring degree of environmental concern as opposed to moral voice. (See sample item below.)

6. You want to buy school supplies that are made from recycled materials, but the school store does not sell them. You would have to find them at another store and would have to use more of your allowance because supplies made from recycled materials are more expensive.

a. *I would buy the supplies made from recycled material because it requires fewer trees to be cut down and more people can enjoy the forests.*

b. *I would buy the supplies made from the recycled material because the Environmental Protection Agency has issued guidelines recommending the use of recycled materials.*

Gender role orientation was measured using an instrument adapted from the work of Harter, Waters, & Whitesell(1997). This was used to identify personality traits traditionally identified as masculine and feminine, and to investigate a possible correlation with care and justice moral orientations.

Procedure

Consent was required at one school and was obtained from 75% of the seventh-grade students. Participants were ensured anonymity. Nonteaching personnel (counselors, aides, graduate students, and investigator) administered surveys except in one school where the science teacher administered the survey.

Students completed a brief personal data section identifying age, gender, ethnicity, and grade in school. Directions were read aloud to the students and a sample item was completed. Each item in the environmental dilemmas section was read aloud for the students, who then completed the remainder of the survey independently.

Scores on the dilemmas were averaged with a high score indicating a care orientation (Justice items were reversed for scoring). As students were directed to consider each of the response items for a dilemma separately, it was possible to score high or low in either or both orientations.

Results

To determine the internal consistency of the survey, Cronbach's Alpha was calculated for the care (.57) and justice (.78) subscales. Item #1 of the care subscale showed a negative correlation (-.16) with the other care items. It was removed, resulting in an improved coefficient of .65 for the revised care subscale. Removing this item from the care subscale eliminated the stem for item #1 in the justice subscale. Removing this item resulted in a very modest reduction of the Cronback's Alpha to .76 for the justice subscale.

Cronbach's Alpha showed a reasonable level of internal consistency for the gender orientation scale, with .86 on the masculinity subscale and .71 on the femininity subscale.

A factor analysis was conducted for the morality scale that showed the presence of three factors. One factor consisted of only one item (#8) which was eliminated leaving two factors. Items #9, #13, #15, and #16 loaded (>.35) on one factor, which was designated the care factor. Item #15 was a justice item and was removed, leaving a 3-item group measuring the care factor. Cronbach's Alpha of .69 was calculated for this new factor. Both care and justice items loaded (>.35) on the remaining factor, indicating that the factor does not clearly indicate the justice orientation as hoped.

Using the care items identified by the factor analysis, results were analyzed using a dependent-samples t test. This analysis showed a significant difference between boys and girls (1.2) at the .0001 level.

Results of the care and justice subscales were analyzed using an independent-samples t test. This analysis revealed a significant difference between girls and boys, $t(279) = 3.2$; $p < .0013$ on their responses to the care scale. Girls scored significantly higher on the care orientation subscale than did boys (girls = 4.4; boys = 4.0). This analysis failed to reveal a significant difference between boys and girls on the justice scale.

When data for the revised care scale and gender were analyzed using an analysis of covariance with gender orientation as a covariate, the effect of gender was eliminated ($F = 13.2$, $p < .0003$). All analyses were conducted using the SAS system (SAS Institute, 1994).

Discussion

The purpose of this study was to investigate whether the distinct moral orientations of care and justice described by Gilligan (1982) would be expressed by young people in the context of environmental dilemmas and whether these moral voices would be associated with sex and/or gender orientation.

The revised three-item care scale was strongly associated with the female participants in the study, lending support to the extension of Gilligan's theory into the area of environmental science. But as Gilligan herself noted, "this association is not absolute." Harter's suggestion that gender role orientation might prove to be a more accurate determinant of moral voice was supported by the results from this study. When controlled for gender role orientation, the

association of the care voice with sex was eliminated. The feminine gender role orientation was the stronger determinant of the care voice for the participants of this study.

Although the instrument identified a care voice, it did not reliably distinguish a justice voice. The disappointing results of the justice subscale are similar to those obtained by Liddell and Davis (1996), who found weak relationships between the justice items in their work to develop their Measure of Moral Orientation. They also found that females scored higher than males on both the care and justice scales, as did the current study, although in both studies only the difference in the care scale was statistically significant. The generally stronger voice expressed by the seventh-grade girls in this study is interesting in light of research showing a loss of voice in girls during the early adolescent years (Brown & Gilligan, 1992; Taylor, Gilligan, & Sullivan, 1995).

Although the care and justice perspectives have been studied in a number of contexts there has been little exploration of their role in decision-making on science issues, or more specifically in environmental decision-making and in environmental education. The instrument developed for this study provides a beginning of this task, with a strong foundation for a care subscale. Further work to develop a justice subscale is needed.

Environmental education is being integrated into an increasing number of science curricula. If consistent gender differences are found in the evaluation of environmental dilemmas, it will be important for educators to be aware of these differences so that they can teach to each student's strengths, and consider them when designing programs and assessments. Ideally, environmental educators will help students become aware of and develop multiple approaches to problem solving and integrate the moral voices of care and justice.

Future Research

The effort to design an instrument that will elicit the care and justice voices is complicated by the fact that the theories of both Kohlberg and Gilligan were developed based on interview protocols. It is further complicated by the fact that both are stage theories designed to determine an individuals' level along a continuum of moral developmental stages, and by the similarities of Kohlberg's Stage 3 and Gilligan's Stage 2. The author is presently conducting a study using a semi-structured interview protocol to elicit spontaneous solutions to environmental dilemmas by 7th-graders. This has the advantage of using methodology similar to that used by Kohlberg and Gilligan, and of not restricting the responses of students to one developmental level or to the researcher's conception of what constitutes a care or justice response.

Studies which suggest that the nature of the dilemma itself affects the moral orientation used present another opportunity for exploration. It may well be that environmental dilemmas elicit the care voice. Beringer (1992) suggests that "When the ethic of justice is extended to include the non-human world, it moves naturally into a mode of care and caring" (p. 39). Investigating this possibility is a further goal of the current study.

Means and Standard Deviations of Care and Justice Orientations by Gender

	CARE		JUSTICE	
Group	**Mean**	**SD**	**Mean**	**SD**
Females (n=142)	4.44	1.21	3.06	0.79
Males (n=139)	3.96	1.36	2.85	0.94

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